

**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, DC 20554**

**In the Matter of**

**QUALCOMM Incorporated**

**Petition for Declaratory Ruling that  
OET-69 is Acceptable To Demonstrate  
Compliance with Section 27.60**

**RM**

**PETITION FOR DECLARATORY RULING**

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## Summary

QUALCOMM Incorporated requests that the FCC issue a declaratory ruling that the interference calculation procedures contained in the Office of Engineering and Technology Bulletin No. 69 (“OET-69”) are acceptable to demonstrate compliance with the TV/DTV interference protection criteria of Section 27.60 of the FCC Rules. Grant of the request will speed the deployment of QUALCOMM’s innovative MediaFLO™ service, a nationwide “mediacast” network delivering many channels of high quality video and audio content, as well as innovative mobile data applications, to third generation mobile phones at mass market prices on Channel 55, part of the Lower 700 MHz spectrum that the Commission auctioned in 2002 and 2003. In some areas of the country, until the DTV transition ends, QUALCOMM can only launch this new innovative service if it can coexist with the TV/DTV channels operating on channels adjacent to or co-channel with QUALCOMM’s Channel 55.

QUALCOMM believes that such compatible coexistence can best be demonstrated using the OET-69 interference methodology. First, OET-69 is a well-understood engineering methodology, with which the Commission and the broadcast industry have considerable experience and expertise. Second, OET-69 is superior to a “contour overlap” methodology in that OET-69 provides more accurate and realistic measurements. Third, OET-69 is particularly well-suited to use with MediaFLO because although the MediaFLO and DTV technologies have fundamental differences, MediaFLO, like DTV, entails one-way, transmit-only operation in the 700 MHz band. Finally, certainty in the appropriate methodology for predicting and avoiding interference will speed the deployment of new 700 MHz services, thereby serving the public interest.

QUALCOMM also asks the Commission to declare that the *de minimis* standard established by Section 73.623(c)(2) is the appropriate standard for measuring acceptable interference. Thus, predicted interference to a total of 2% of a station’s service population (including those receiving the station’s signal via cable and satellite) would be considered acceptable. This standard, already used in predicting DTV interference, is appropriate, given the small number of affected viewers, the short-term nature of the interference since it would cease at the end of the DTV transition, and the benefits anticipated by the 170 million mobile phone users throughout the country. Moreover, because MediaFLO is a one-way service in which mobiles receive but do not transmit in the 700 MHz band, any *de minimis* interference is relatively predictable and containable.

Finally, QUALCOMM asks the Commission to establish a streamlined processing procedure for OET-69 showings, including a rebuttable public interest presumption and a shortened public notice period. These measures will accelerate the deployment of MediaFLO and other new 700 MHz services, will increase the value of the spectrum, and will relieve the administrative burden on the FCC, without substantially affecting the provision of broadcast service.

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**I INTRODUCTION**

QUALCOMM Incorporated (“QUALCOMM”) hereby requests that the Federal Communications Commission (“FCC” or “Commission”) issue a declaratory ruling that the process contained in Office of Engineering and Technology Bulletin No. 69 (“OET-69”) is an acceptable engineering methodology to demonstrate compliance with the TV/DTV interference protection criteria of Section 27.60 of the Commission’s Rules. Additionally, QUALCOMM requests that the Commission declare that a *de minimis* threshold of 2% be established as the acceptable standard for interference. Finally, QUALCOMM asks that the Commission establish streamlined processing procedures for its submissions showing compliance with OET-69 and the *de minimis* threshold and apply a rebuttable presumption to such submissions. Streamlined processing, including a rebuttable presumption, is warranted because the public interest strongly

favors allowing QUALCOMM to operate its new MediaFLO™ network on the Lower 700 MHz band if in compliance with OET-69 and the *de minimis* threshold.

Pursuant to Section 1.2 of the Commission's Rules, the Commission may issue such a ruling in order to terminate a controversy or remove uncertainty.<sup>1</sup> Issuance of the ruling proposed by QUALCOMM will eliminate the uncertainty faced by QUALCOMM, and possibly other 700 MHz licensees, who have plans for deployment of their systems but are unsure of the method to be used to determine compatibility with co-channel or adjacent channel TV/DTV stations.<sup>2</sup> Resolution of this matter, according to the procedures proposed herein, will speed the deployment of MediaFLO and other 700 MHz services, making those services available to the public during the DTV transition. Out-of-core stations will continue to be protected from unacceptable interference during the transition, while new 700 MHz licensees will be able to begin the provision of service. Thus, the public interest will be served.

It bears emphasis that the requested declaratory ruling is strictly a temporary device necessary to permit QUALCOMM and other similarly situated 700 MHz licensees to go on the air in certain markets before the completion of the DTV transition. Any *de minimis* interference to co-channel or adjacent channel TV/DTV operations will only occur on a temporary basis during the transition. Once the transition is completed, after the TV stations have ceased operations, moved to their re-packed DTV allotments in the core spectrum, and returned their 700 MHz spectrum, there will not be any interference to TV/DTV stations from the new services on the 700 MHz spectrum. Furthermore, the number of TV/DTV stations possibly affected by

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<sup>1</sup> 47 C.F.R. § 1.2.

<sup>2</sup> QUALCOMM seeks this declaratory ruling for itself and its MediaFLO service, which has certain signal characteristics similar to those of digital TV ("DTV") stations. It is possible that other 700 MHz licensees can take advantage of the streamlined processing contemplated by this request, as well as the certainty provided by a declaratory ruling that OET-69 is an acceptable engineering methodology to demonstrate compliance with Section 27.60 of the Commission's Rules.

QUALCOMM's MediaFLO services would be relatively small. In the majority of markets, there is either (a) no co-channel or adjacent channel TV/DTV station present; or (b) the standard contour overlap approach satisfies the requirements of Section 27.60. Only in a subset of markets will submission of an engineering study be required. However, absent a grant of the requested declaratory ruling the residents of those markets will not be able to enjoy the benefits of the innovative MediaFLO service.

Moreover, as QUALCOMM shows herein, the number of viewers whose television service will be adversely affected in these few markets will be very small because most of the viewers whose over-the-air service could be affected subscribe to cable or satellite service and will therefore, not suffer any interference whatsoever. Indeed, QUALCOMM is proposing an interference methodology that will actually result in greater protection of incumbent TV/DTV stations than they receive under the existing Part 73 rules, all in an effort to minimize any adverse impact from the deployment of MediaFLO. By contrast, the vast majority of residents in the markets in question are among the 170 million Americans who own mobile phones and thus comprise the target group who could enjoy the benefits of the exciting new mobile service that QUALCOMM will deploy.

Finally, as explained herein, QUALCOMM proposes to use its 700 MHz spectrum for one way transmissions - i.e., over the forward link only - to mobile phones. The phones will receive, but not transmit, over the 700 MHz spectrum. Rather, they transmit, as today, over cellular or PCS spectrum or via some other IP-based return path, but not over the 700 MHz spectrum. This use of 700 MHz for forward link only operations, and not for transmissions from mobile phones, ensures that QUALCOMM's 700 MHz transmissions will be predictable and that interference issues will be contained and highly limited.

For all of these reasons, the public interest favors allowing QUALCOMM and other 700 MHz licensees to deploy innovative, exciting new services while causing *de minimis* interference to TV/DTV stations on a temporary basis.

## II BACKGROUND

### A. QUALCOMM/MediaFLO

QUALCOMM Incorporated, headquartered in San Diego, is the world leader in the development of digital wireless technology, including Code Division Multiple Access (“CDMA”). QUALCOMM is the licensee of 6 Economic Area Groupings (“EAG”) of 6 MHz (Block D, Channel 55), giving QUALCOMM licenses that cover the entire nation in the Lower 700 MHz band, which is regulated under Part 27 of the Commission’s Rules.<sup>3</sup> QUALCOMM’s wholly-owned subsidiary, MediaFLO USA Inc., will use these licenses to deploy and operate a nationwide “mediacast” network, delivering many channels of high quality video and audio content, as well as innovative mobile data applications, to third generation mobile phones at mass market prices.

Beginning commercial operations as early as 2006 in many parts of the country, QUALCOMM will offer the network as a shared resource of U.S. CDMA2000 and WCDMA cellular operators, enabling them to deliver mobile interactive multimedia to their wireless subscribers without the cost of network deployment and operation. MediaFLO has been designed so that customers will have a familiar user experience, that is, a channel guide and the ability to pick and choose the type of content they want to view or listen to on their mobile

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<sup>3</sup> 47 C.F.R. § 27.1 *et seq.* QUALCOMM acquired licenses for 5 EAGs in Auction 49 and recently acquired the license for the 6<sup>th</sup> EAG by assignment from the original licensee.

phones. Some of the content will be available for real-time viewing while other content will be stored on the customer device for later viewing, a technique known as clip-casting.

Supporting between 50 and 100 national and local content channels, including up to 15 live streaming channels and numerous clip-cast and audio channels, the system will give content providers a major new distribution channel that complements their current offerings, enabling them to reach their audiences when those audiences are away from home and on the go. U.S. consumers will gain access to compelling multimedia services when and where they want them.

QUALCOMM's FLO™ (Forward Link Only) technology in the 700 MHz spectrum offers distinct efficiency and cost advantages in delivering content to a very large mobile subscriber base. Deploying multicast transmitters on tall towers provides superior coverage with 30 to 50 times fewer towers as compared to cellular and higher frequency-based unicast systems. Partnering wireless operators will be able to offer new interactive and differentiated services in conjunction with their existing cellular networks without the cost of further deployment or need for new spectrum. Moreover, FLO technology is specifically designed to minimize the power consumption and size of mobile phones and to be integrated into existing handset designs.

QUALCOMM has committed significant resources to the development and deployment of this exciting new service and anticipates commercial launch in the third quarter of 2006. Given QUALCOMM's track record in the development and proliferation of pioneering wireless technologies, the incorporation of those technologies into chipsets, end-user devices and infrastructure equipment, and the integration of these capabilities into end-to-end systems, it is



reasonable to expect similar success in bringing high-quality interactive mobile multimedia services to consumers in that time frame.

In some areas of the country, commercial operation will depend upon the ability of MediaFLO to coexist, if only for a temporary period, with TV/DTV stations operating on channels adjacent to or co-channel with MediaFLO's Channel 55. QUALCOMM believes that that coexistence can best be demonstrated using the OET-69 interference protection methodology – a methodology familiar to the Commission and to the broadcast industry. By adopting the rulings requested herein, the Commission can assure the rapid nationwide deployment of MediaFLO and other potential new wireless services using 700 MHz spectrum.

**B. Part 27 Licensees and the DTV Transition**

The advent of digital technology is an important advance in the quality of broadcast television. It also has significant implications for the development of innovative wireless services, such as MediaFLO. Because digital television technology is more spectrally efficient than analog technology, the same amount of television service can operate in a reduced allocation. By relocating all television operations to the core spectrum (Channels 2-51), the Commission is able to “recapture” existing broadcast spectrum and make it available for auction. The recaptured spectrum of interest to QUALCOMM was the Lower 700 MHz spectrum (698-746 MHz, comprising Channels 52-59), which the Commission allocated to fixed, mobile and broadcast service under the framework of Part 27's technical licensing and operating rules.<sup>4</sup> The propagation characteristics of the Lower 700 MHz Band make it particularly advantageous for the MediaFLO service. These propagation characteristics allow better coverage in the Lower

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<sup>4</sup> *Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59)*, GN Docket No. 01-74, *Notice of Proposed Rule Making*, 16 FCC Rcd 7278 (2001) (*NPRM*), *Report and Order*, 17 FCC Rcd 1022 (2002) (*Lower 700 MHz Order*), *Memorandum Opinion and Order*, 17 FCC Rcd 11613 (2002) (*Lower 700 MHz Reconsideration*).

700 MHz Band than would be possible at higher frequencies and this factor reduces capital expenditures as well as operating costs for a service such as QUALCOMM's. In addition, 700 MHz signals are better at penetrating buildings than spectrum at higher frequencies. In short, the same characteristics that made 700 MHz originally attractive to television licensees, makes the spectrum well-suited for MediaFLO.

Under Section 309(j)(14) of the Communications Act, analog television licenses may not be renewed to provide service after December 31, 2006, subject to the possibility of an extension under certain circumstances.<sup>5</sup> Until the transition to all digital television is over, Part 27 licensees will be required to co-exist with broadcast licensees on Channels 52-59. The Commission has recognized the importance of adopting rules that ensure adequate protection of incumbent full-power analog and digital broadcasters during the transition period.<sup>6</sup> Nevertheless, the Commission has also recognized that there will be circumstances in which Part 27 licensees can coexist with existing broadcast licensees. Recently, the Commission determined that the deployment of land mobile services was in the public interest where interference was unlikely.<sup>7</sup> Specifically, the Commission found that:

the underlying purpose of Section 27.60 is to permit 700 MHz operations where it is demonstrated that co-channel or adjacent channel interference to TV/DTV stations will be prevented.<sup>8</sup>

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<sup>5</sup> See 47 U.S.C. § 309(j)(14). QUALCOMM recognizes the likelihood of an extension, but commends the Commission on its efforts to hasten the DTV transition. See, e.g. *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 03-15, FCC 04-192, Released September 7, 2004 (*Second Periodic Review*).

<sup>6</sup> *Lower 700 MHz Order* at ¶ 38.

<sup>7</sup> See *Access Spectrum, LLC Request for Waiver of Section 27.60*, DA 04-2527, released August 12, 2004. (*Access Spectrum Order*)

<sup>8</sup> *Id* at ¶ 14.

This Petition for Declaratory Ruling seeks to establish a clear method by which that demonstration can be made.

**C. Section 27.60**

Section 27.60 of the Commission's rules was added in 2000 in connection with adoption of service rules for the Upper 700 MHz Band.<sup>9</sup> Noting that land mobile and TV stations have successfully shared the 470-512 Band (Channels 14-20), the Commission decided to use the same techniques in the Upper 700 MHz Band. Specifically, the Commission relied on "minimum separation distances based on various heights and powers of the land mobile stations to prevent harmful interference."<sup>10</sup> Thus the Commission simply incorporated the provisions of Section 90.545 of its rules, dealing with land mobile radio services, into Section 27.60 dealing with Upper – and eventually Lower – 700 MHz Band services.

Section 27.60 establishes the interference protection criteria for TV/DTV stations and imposes technical requirements upon the 700 MHz licensee. First, the Section imposes "geographic separation" requirements, mandating that licensees choose site locations a sufficient distance from co-channel and adjacent channel TV and DTV stations, as expressed in tables in Section 90.309.<sup>11</sup>

Second, when station parameters do not apply, licensees are permitted to calculate geographic separation in accordance with desired signal to undesired signal ratios ("D/U ratios")

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<sup>9</sup> See *Service Rules for the 746-764 and 776-794 MHz Bands and Revisions to Part 27 of the Commission's Rules*, 15 FCC Rcd 476 (2000) (*Upper 700 MHz First Report and Order*).

<sup>10</sup> *Id* at 532, noting *Further Sharing of the UHF Television Band by Private Land Mobile Radio Services*, 101 FCC 2d 852, 865 (1985).

<sup>11</sup> 47 C.F.R. § 27.60(b)(1)(i).

specified in the rule.<sup>12</sup> This is generally recognized as the non-overlapping contour approach used in the past to determine adequate distances between TV stations.

Third, the rule permits applicants to submit engineering studies to justify proposed separations based on the “actual” parameters of the 700 MHz licensee and the TV/DTV station it is trying to protect.<sup>13</sup>

Finally, the rule permits licensees to obtain written concurrence from the applicable TV/DTV station.<sup>14</sup>

In simple terms, Section 27.60(b) describes alternative methods for a 700 MHz licensee to locate closer to an analog or DTV antenna while still complying with the interference protection requirements in the Rules.<sup>15</sup> As the Commission described while recently amending Section 27.60, the licensee may submit an engineering study that considers the “actual” rather than the “hypothetical” parameters of the analog TV or DTV station.<sup>16</sup> For example, the study might show that a station’s actual coverage area is smaller than its hypothetical coverage area because the station is operating with lower power than presumed or because of other factors such as terrain or pre-existing interference. In those cases, where an engineering study can demonstrate compliance with the interference protection criteria, the 700 MHz transmitter and the broadcast facility can be more closely spaced. QUALCOMM believes that engineering studies based on OET-69 are appropriate to demonstrate compliance with the Section 27.60 interference protection criteria.

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<sup>12</sup> 47 C.F.R. § 27.60(b)(1)(ii).

<sup>13</sup> 47 C.F.R. § 27.60(b)(1)(iii).

<sup>14</sup> 47 C.F. R. § 27.60(b)(1)(iv).

<sup>15</sup> See *Second Periodic Review at ¶ 116*.

<sup>16</sup> *Id.*

**D. OET-69**

Office of Engineering and Technology Bulletin No 69, entitled “Longley-Rice Methodology for Evaluating TV Coverage and Interference” is used to make predictions of radio field strength at specific geographic points based on the elevation profile of terrain between the transmitter and each specific reception point.<sup>17</sup> It uses those predictions to calculate population within a service area likely to be affected by interference. Because OET-69 provides the flexibility “to take into account intervening terrain and engineering techniques, such as directional and down-tilt antennas,” it is considered an accurate, real-life protector against interference.<sup>18</sup> Indeed, the Commission recently affirmed its selection of the OET-69 methodology in its digital low power TV proceeding.<sup>19</sup>

OET-69 is referenced in Section 73.622 and 73.623, establishing the DTV Table of Allotments and providing procedures for changes to that Table. In 1997, the Chief of the Office of Engineering and Technology described OET-69’s origins and uses:

[the OET-69] methodologies were in general developed by the broadcast industry through our Advisory Committee on Advanced Television Service. As early as 1992 they were used by the Advisory Committee in evaluating the various DTV technical systems and were also used in evaluating the ATSC DTV system, a modified version of which was selected by the Commission as the DTV standard. In addition, these same methodologies were used by the Association of Maximum Service Television (“MSTV”), the Broadcast Caucus and many engineering consulting firms in evaluating the draft DTV Table of Allotments that was included in the 1996 Sixth Further Notice of Proposed Rulemaking in this

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<sup>17</sup> See *Office of Engineering and Technology Releases Update of OET Bulletin No. 69*, Public Notice DA 04-319, February 6, 2004.

<sup>18</sup> See *Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Requirement through the Year 2010*, 15 FCC Rcd 16844 (2000) ¶ 31.

<sup>19</sup> *Amendment of Parts 73 and 74 of the Commission’s Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations*, FCC 04-220, released September 30, 2004. (*LPTV Order*)

proceeding and in evaluating the alternative DTV Table submitted by the broadcast industry.<sup>20</sup>

OET-69 is an interference protection methodology, well known to the broadcast community, which can be used effectively to allow the introduction of new services in the Lower 700 MHz Band, while affording broadcast stations assurance that they will not receive unacceptable interference from 700 MHz Licensees. In order to make OET-69 applicable to Part 27 Licensees, the OET-69 computer software will need to incorporate the D/U ratios found in Part 27.60. We understand that this addition to OET-69 is easily made and will have no impact on Part 73 calculations.<sup>21</sup>

### **III PETITION FOR DECLARATORY RULING**

#### **A. That OET-69 Is An Acceptable Engineering Methodology To Establish Compliance With Section 27.60.**

QUALCOMM requests that the Commission declare that OET-69, including use of the Longley-Rice predictive methodology and population calculations, is an acceptable engineering methodology to demonstrate compliance with Section 27.60. It is clear that 700 MHz licensees are eager to use the spectrum acquired in Auctions 44 and 49. As it becomes increasingly likely that the DTV transition will extend beyond December 31, 2006, those licensees will increase their efforts to begin operations on those channels where there will not be interference with adjacent channel or co-channel broadcast licensees.

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<sup>20</sup> *Advanced Television Systems And Their Impact Upon The Existing Television Broadcast Service*, 12 FCC Red 9688, 9689 (1997).

<sup>21</sup> See attached affidavit of William Meintel, at Attachment A.

In some cases, the 700 MHz licensees will be able to locate transmitters at a sufficient geographic distance from the broadcast transmitter as to be able to satisfy the geographic separation requirements of Section 27.60. In other cases, the 700 MHz licensees will be able to calculate geographic separation in accordance with the overlapping contour approach associated with the D/U signal ratios. In still other cases, 700 MHz licensees will gain written agreement from the affected broadcast licensee.

However, in particular markets, where the other three methods permitted by Section 27.60 are unavailing, QUALCOMM and likely other 700 MHz licensees will seek to demonstrate compliance with the Commission's TV/DTV protection requirements by submitting an engineering study justifying a proposed geographic separation based on the actual parameters of the proposed Part 27 station and the actual parameters of the TV/DTV station requiring protection. To date, two such 700 MHz licensees have submitted studies demonstrating compliance, Access Spectrum LLC and Aloha Partners, LP. The Commission has granted Access Spectrum's requested waiver and has permitted operations. The Aloha Partners waiver request is still pending.

QUALCOMM believes that other 700 MHz licensees, including itself, will seek to file engineering studies pursuant to Section 27.60(b)(1)(iii). In order to make the process more efficient, the Commission should clarify the type of engineering study it will deem acceptable to make the required justification of a geographic separation less than that otherwise contemplated in Section 27.60. QUALCOMM believes that, while other types of studies may be acceptable as well, the engineering study contemplated by the OET-69 process is the preferred methodology for its MediaFLO system for several reasons.

First, as discussed above, the broadcast industry is very familiar with OET-69. It has been used for years in the context of DTV and LPTV allocations. Broadcast engineering consultants have significant experience and expertise in applying OET-69 in “short-spacing” cases. This experience and expertise will give the industry comfort in analyzing the OET-69 submissions made by the 700 MHz licensees.

Second, the Commission has recently determined that OET-69 is the single interference prediction methodology that should be used in evaluating digital LPTV and TV translator applications, as opposed to using the overlapping contour D/U ratio approach.<sup>22</sup> Specifically, OET-69 overcomes the shortcomings of the contour overlap methodology, among which are:

... incomplete consideration of terrain effects on signal propagation, not considering locations inside the protected contour where interference might occur despite protection being afforded along the contour, not considering the effects of interference predicted from other stations (interference “masking”), not accounting for the directional signal attenuation characteristics of outdoor receiving antennas, and not making any allowance for signal attenuation characteristics of transmitting antennas in the vertical plane.<sup>23</sup>

In short, the characteristics of the OET-69 methodology are superior to the contour overlap methodology in that OET-69 provides more accurate and realistic measurements. Moreover, the Commission pointed out that the computer model has been used for several years in the processing of DTV, NTSC TV, LPTV and TV translator applications,

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<sup>22</sup> *LPTV Order* at ¶ 102.

<sup>23</sup> *LPTV Order* at ¶93.



affirming that the OET-69 methodology is the most suitable approach for assessing the impact of interference to and from TV/DTV stations.<sup>24</sup>

Third, in addition to being the most suitable interference methodology for assessing the impact of interference to and from TV/DTV stations, QUALCOMM believes that OET-69 is also the most appropriate methodology for assessing the specific impact of MediaFLO on TV/DTV stations because, although FLO has fundamental differences from ATSC, from an interference perspective MediaFLO shares certain common characteristics. QUALCOMM's FLO technology utilizes Orthogonal Frequency Divisional Multiplexing (OFDM), which is a digital wireless air interface that uses multicarrier techniques to transmit data via precisely spaced sub-carrier frequencies. The U.S. DTV standard, ATSC, utilizes 8-VSB, which is a different digital modulation scheme. However, the interference properties of both of these signals are "noise-like".<sup>25</sup> Moreover, both the FLO and ATSC technologies occupy similar bandwidths – 5.5-6 MHz – which is an important element in an interference impact analysis.<sup>26</sup> In addition, like broadcast TV/DTV stations, but unlike other commercial mobile radio systems, the MediaFLO system is a one-way, base-transmit only service, which eliminates the need to factor mobile transmit operations into an interference analysis. Finally, while the MediaFLO system will be operating at lower power levels than most full-power TV/DTV

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<sup>24</sup> LPTV Order at ¶ 95.

<sup>25</sup> "The difference between COFDM and 8VSB in interference caused to the existing NTSC service would be minimal." *8VSB/COFDM Comparison Report* (Cleveland, Washington, Baltimore), January 18, 2001, <http://web-star.com/hdvtv/mstvttestsum.html>. "Since both VSB and CODM signals behave more or less like white noise, they have the same impact to the analog TV systems." *Comparison of Terrestrial DTV Transmission Systems: The ATSC 8-VSB, the DVB-T COFDM and the ISDB-T BST-OFDM*, IEEE Transactions on Broadcasting, June 2000, page 11 (editorial error corrected).

<sup>26</sup> Other Part 27 licensees, including Access Spectrum LLC and Aloha Partners, LP, have announced plans to use narrower band technologies with channel bandwidths of no more than 1.25 MHz. The engineering methodologies used in their recent Part 27.60 waiver requests, based on the 1986 Stanks Report, are unsuitable for analyzing the impact of a wider band system like MediaFLO.

stations, its planned 50 kW ERP transmitters have power levels similar to LPTV stations, which also rely on OET-69 to assess their impact on full-power TV and DTV stations. Thus, despite the differences between FLO and ATSC, given the aforementioned technical similarities, it is reasonable to apply to MediaFLO the OET-69 interference methodology that was originally developed for ATSC since FLO is similar to a lower power ATSC signal for purposes of interference protection analyses.

Fourth, the identification of an acceptable methodology for predicting and avoiding interference will speed the deployment of new 700 MHz services. If the DTV transition is delayed, and if interference protection methods are not identified, there will be no viable means for 700 MHz licensees to deploy their services, except on a limited basis. That will have a negative impact on consumer acceptance and on the price and availability of equipment in the marketplace and will reduce the value of the spectrum and thwart the purpose of the Congressional mandate in Section 309(j)(14) to reallocate and auction the band.

In the case of MediaFLO, which QUALCOMM intends to be a nationwide service, there will be some areas where service can be deployed quickly since there are no incumbent stations on Channels 54-56. In other areas, service can be deployed only after carefully designing the system to avoid interference. Having a known acceptable methodology for demonstrating that avoidance will greatly speed the nationwide deployment of MediaFLO, while providing a uniform standard for compliance with Part 27.60 requirements.

For these reasons, QUALCOMM believes the Commission should declare OET-69 an acceptable methodology for demonstrating compliance with Section 27.60. To aid the Commission in making this determination, QUALCOMM and the engineering consultant firm,

PCCI, Inc., have prepared sample engineering studies in each of the following circumstances, applied to both single and multiple Part 27 transmitters:

- Part 27 Licensee Outside a Station's Grade B Contour;<sup>27</sup>
- Part 27 Licensee Inside a Station's Grade B Contour, Using a Co-located Adjacent Channel Frequency;
- Part 27 Licensee Inside a Station's Grade B Contour, Using a Non-Co-located Adjacent Channel Frequency.<sup>28</sup>

As the attached engineering studies demonstrate, QUALCOMM proposes to apply the FCC's OET-69 methodology to analyze the impact of QUALCOMM's MediaFLO transmitters on both co-channel and adjacent channel TV and DTV stations. This OET-69 process is the same as that used in DTV applications and modifications to the DTV Table of Allotments with minor adjustments related to implementation of the Part 27.60 rules. These differences involve the use of Part 27 rather than Part 73 D/U ratios (Part 27 ratios are more stringent than the Part 73 ratios) and the analysis of the impact of multiple MediaFLO transmitters on co-channel and/or adjacent channel stations (TV to TV station OET-69 studies usually assess the impact of a single transmitter on existing stations). Otherwise, the process is identical to that used by DTV stations, including the use the definition of co-location (Part 73.623(d)(2)) as well as the process for determining the effects of "masking" (aka calculating pre-existing interference).

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<sup>27</sup> We note that according to the Commission's *Access Spectrum Order* licensees proposing to demonstrate interference free operations by locating facilities outside the Grade B contour are not required to seek a waiver of the Commission's Rules. See *Access Spectrum Order* at n. 34.

<sup>28</sup> See Attachment B. QUALCOMM will submit these engineering studies, together with Forms 601 and waiver requests as appropriate, in the near future.

QUALCOMM believes that the OET-69 process is an appropriate one to assess the impact of MediaFLO transmitters on co-channel and adjacent channel TV and DTV stations. With the minor adjustments described above and in the attached engineering statement, engineering studies based on an OET-69 analysis will result in accurate determinations of the impact of MediaFLO transmitters on incumbent stations. Given that the Part 27 D/U ratios and out-band-emission requirements are more stringent than their Part 73 equivalents,<sup>29</sup> approval of QUALCOMM's OET-69 engineering studies will actually result in *greater* protection of incumbent TV and DTV stations than what is authorized under the Commission's Part 73 rules. For these reasons, QUALCOMM urges the Commission to declare that OET-69 is an acceptable methodology for QUALCOMM and other similarly situated Part 27 licensees to demonstrate compliance with Part 27.60.

The three attached engineering studies cover the Phoenix, New Orleans and Oklahoma City markets. The Phoenix study shows that QUALCOMM's MediaFLO transmitters would cause interference to 0.44% and .09% of the population covered by the licensed Channel 56 station and the authorized Channel 56 station, respectively. The New Orleans study shows interference to 0.26% and 0.15% of the population served by the Channel 54 and 56 stations, respectively. The Oklahoma City study shows interference to 1.86% of the population served by the authorized Channel 55 station. This is truly *de minimis* interference.

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<sup>29</sup> A comparison of the Part 27 and Part 73 D/U ratios is provided in the attached engineering statement in Part 2, Evaluation of Interference, which appears on p. 3. The Part 27.53 out-of-band emission limit for the Lower 700 MHz band is also more stringent than the Part 73.622 equivalent for DTV. Assuming an equal transmit power of 5 kW, the Part 27.53 out-of-band emission limit allows 17.5 dB less power into an adjacent channel than the 73.622 DTV out-of-band emission limit. Comparing a maximum power Part 27 transmitter at 5 kW (50 kW ERP) to a maximum power Part 73 DTV transmitter at 50 kW (1000 kW ERP), the adjacent channel energy from a DTV transmitter will be 27 dB greater than the adjacent channel energy from a Part 27 transmitter.

**B. That the *De Minimis* Standard Established By Section 73.623(c)(2) Is The Appropriate Standard For Measuring Unacceptable Interference.**

An integral part of the OET-69 methodology is the prediction of interference to the service population of a TV station. Pursuant to Section 73.623 of the Rules, predicted interference to 2% of the population served by a station is considered *de minimis*. QUALCOMM asks that the same standard be applied to requests under Section 27.60 of the Rules.

In its Reconsideration of the Sixth Report and Order in the DTV proceeding, the Commission decided that a *de minimis* standard for new interference was needed to provide flexibility for broadcasters in the implementation of DTV.<sup>30</sup> The Commission therefore replaced its then current standard of “no new interference” with a standard suggested by the major broadcast groups.

Under this new standard, DTV stations would be permitted to increase power or make other changes in their operation, such as modification of their antenna height or transmitter location where the change would not result in more than a 2 percent increase in interference to the population served by another station; provided, however, that no new interference may be caused to a station that already experiences interference to 10 percent or more of its population or that would result in a station’s receiving interference in excess of 10 percent of its population.<sup>31</sup>

In creating the *de minimis* standard, the Commission found benefit in providing additional opportunities for stations to maximize their DTV coverage, even at the expense of other DTV and full-power analog TV licensees. Similarly, the Commission can find benefit in

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<sup>30</sup> *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, 13 FCC Rcd 1418 (1998). (*DTV Reconsideration*)

<sup>31</sup> See *DTV Reconsideration* at ¶ 80.

the provision of new wireless services, including MediaFLO. The minimal interference with DTV or TV operations, when balanced against the benefits of the introduction of new wireless services, is more than acceptable.

Further, in the case of *de minimis* interference by 700 MHz licensees, the problem will not only be minimal, it will be temporary. As the Commission proceeds with its plans for moving all broadcast stations into the core spectrum (Channels 2-51), any possibility of interference at all diminishes. It is also important to note that the actual number of consumers affected will be considerably less than 2% of the population. The *de minimis* threshold includes all viewers, even those that receive the affected station via cable or satellite, who would not be affected at all by any interference. Consequently the actual number of affected viewers will be reduced to only those that actually receive and view the affected station over-the-air. The small number of over-the-air viewers who would actually be affected must be balanced against the 170 million mobile phone users throughout the country who comprise the target market for the new MediaFLO service.

There are important public interest benefits anticipated by the move to DTV within the core spectrum, including an increase in spectrum efficiency and the nationwide deployment of new services, both digital TV and the variety of new services to be provided by the 700 MHz licensees. This is the ultimate goal and everything possible, including applying a 2 percent *de minimis* threshold, should be done to achieve that goal quickly.

In a recent case, however, the Commission decided not to apply the 2% *de minimis* criteria found in Section 73.623 of the Rules. In the case of digital LPTV, even though the Commission required use of a single interference prediction methodology, the OET-69 methodology, it concluded that the “no interference” tolerance (less than 0.5%) was more

appropriate than the *de minimis* threshold.<sup>32</sup> QUALCOMM believes the case of LPTV, a secondary service, is distinguishable from the case of advanced wireless services, a co-primary service for which QUALCOMM and the other 700 MHz licensees hold licenses. First, we note that the Commission applied the 2% threshold to secondary-to-secondary interference, implying that, when services are co-equal, the 2% *de minimis* rule is appropriate. Second, in comparing the benefit offsetting the loss of service to interference in the LPTV case to the DTV case, the Commission found the former to be lacking. In the case of LPTV, a secondary service often found in rural communities, the entire new service area may contain fewer people than 2% of the population served by the interfered-with full service station.<sup>33</sup> Clearly, in the case of LPTV, the benefit does not offset the loss of service to a small percentage of TV/DTV viewers.

This should be contrasted with the benefits anticipated from the new advanced wireless services to be offered by the 700 MHz licensees. The ability to deploy 700 MHz services more quickly is a significant benefit and the number of consumers to whom 700 MHz services will be made available will be far greater than the minimal 2% that may be affected by interference. Indeed, the wide range and substantial amount of video, audio and data content to be delivered by MediaFLO should be contrasted with the single channel that may receive minimal interference to a minute percentage of viewers in the market in question. The enormous benefit this increased choice provides to the entire population far outweighs the potential loss to a small percentage of over-the-air TV/DTV viewers.

In addition, QUALCOMM believes that the *Upper 700 MHz Third Report and Order* provides a better model of how the Commission should deal with *de minimis*

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<sup>32</sup> LPTV Order at ¶ 103.

<sup>33</sup> LPTV Order at ¶ 103.

interference.<sup>34</sup> There, the Commission considered interference protection issues stemming from three-way voluntary transition agreements in which a 700 MHz licensee agrees with a TV incumbent in Channels 59-69 to relocate to lower band TV channels that would be voluntarily cleared by the lower band incumbent.<sup>35</sup> While the Commission supported the voluntary arrangements, it recognized that there may be occasions where another TV incumbent, not a party to the voluntary transition agreements, would receive some interference from the relocated station. The Commission pondered whether the standard in those circumstances should be the 2% *de minimis* standard, or the “no new interference” standard advocated by broadcast groups. The Commission rejected the latter standard and adopted the 2% *de minimis* standard finding that:

relocation proposals that can be achieved in a manner consistent with our existing interference protection standards should be encouraged so as to facilitate the congressional intent underlying the allocation of these bands for new wireless users.<sup>36</sup>

On reconsideration, some broadcaster groups argued that the Commission misapplied the *de minimis* standard, designed to address the need to facilitate DTV, to a completely different problem, the need to clear space in the 700 MHz band.<sup>37</sup> The Commission rejected this argument, noting that clearing the Upper 700 MHz band has long been an integral part of the DTV transition.<sup>38</sup> The Commission found that its DTV interference protection standards are based on the recognition that a *de minimis* standard for permissible new

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<sup>34</sup> Service Rules for the 746-764 and 776-794 MHz Bands and Revisions to Part 27 of the Commission’s Rules, 16 FCC Rcd 2703 (2001). (*Upper 700 MHz Third Report and Order*)

<sup>35</sup> *Id* at ¶ 12.

<sup>36</sup> *Id* at ¶ 22.

<sup>37</sup> Service Rules for the 746-764 and 776-794 MHz Bands, 16 FCC Rcd 21633, ¶ 13 (2001). (*Upper 700 MHz Reconsideration*)

<sup>38</sup> *Id* at ¶ 14.



interference is needed to provide flexibility for broadcasters in the implementation of DTV, “a process which includes recovery and clearing of spectrum currently used for television service.”<sup>39</sup>

There would, of course, be no benefit to the public from the recovery and clearing of 700 MHz spectrum were it not for the potential benefits that the public will reap when that spectrum is used for new advanced wireless services, such as MediaFLO. Certainly there is an integral connection between the DTV transition and band clearing – Congress mandated the DTV transition to ensure that the public received the benefits of digital television, but also to maximize the value of the 700 MHz band and the benefits to the public from the new services to be deployed on that band. An interference protection method designed to provide flexibility for broadcasters in carrying out the DTV transition is thus appropriately used to provide temporary flexibility to 700 MHz licensees while the band is being cleared.

For these reasons, QUALCOMM urges the Commission to adopt the *de minimis* standard of 2% of the population for measuring interference.

**C. That A Rebuttable Presumption And Streamlined Processing Procedure Should Apply.**

QUALCOMM also asks the Commission to establish streamlined processing procedures for OET-69 showings. It is important that 700 MHz services be deployed rapidly and without delay. When QUALCOMM submits a showing that it will comply with OET-69 in a particular market, the burden should then shift to any objector to show that in fact QUALCOMM will not comply. Absent the filing of such an objection, QUALCOMM should be able to go on the air.

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<sup>39</sup> *Id* at ¶ 15.

QUALCOMM suggests that the streamlined procedure include a shortened public notice period. For example, a 700 MHz licensee would electronically file the required showing, as an engineering study attached to a Form 601.<sup>40</sup> Fourteen days after the Form 601 appears on Public Notice, comments would be due. If no comments are filed, the next weekly Public Notice would reflect acceptance of the engineering study showing. At that point the 700 MHz license would be free to begin operations.

The Commission uses this type of streamlined procedure for assignment applications in wireless services.<sup>41</sup> Here, the streamlined procedure would only apply if the 700 MHz licensee filed an engineering study using the OET-69 methodology and demonstrating that potential interference would be *de minimis*.

In the case of markets in which a 700 MHz licensee seeks a waiver of the Commission's rules in reliance on such an OET-69-based engineering study, we believe that, where no comments have been received, the Commission could include grant of the waiver request in the Public Notice accepting the Section 27.60 engineering study.<sup>42</sup>

Of course, where objections have been received, these streamlined procedures would not apply. In those cases, QUALCOMM believes that the public interest requires that the Commission establish a rebuttable presumption in favor of the OET-69 showing. The Commission took a similar step in establishing a presumption favoring grant of voluntary

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<sup>40</sup> See *supra* at n. 24.

<sup>41</sup> See *Federal Communications Bar Association's Petition for Forbearance from Section 310(d) of the Communications Act Regarding Non-Substantial Assignment of Licenses and Transfers of Control Involving Telecommunications Carriers Licensed by the Wireless Telecommunications Bureau*, 13 FCC Rcd 6293 (1998).

<sup>42</sup> QUALCOMM recognizes the anomaly inherent in a "streamlined" waiver request. However, in view of the Commission's decision to require waiver requests in the *Access Spectrum Order*, it seems necessary to suggest a procedure which will reduce the administrative burden associated with that decision.

agreements for band clearing in the *Upper 700 MHz Reconsideration Order*.<sup>43</sup> In that case, the Commission decided that it would presume the public interest is substantially furthered when an applicant demonstrates that grant of the application would result in specific benefits and avoid specific detriments. The Commission identified those benefits as when the request would

- (1) make new or expanded wireless service, such as “2.5” or “3G” services, available to consumers;
- (2) clear commercial frequencies that enable provision of public safety services; or
- (3) would result in the provision of wireless service to rural or other underserved communities.<sup>44</sup>

The applicant would also have to show that grant of the request would not result in any one of the following:

- (1) the loss of any of the four stations in the designated market area (“DMA”) with the largest audience share;
- (2) the loss of the sole service licensed to the local community; or
- (3) the loss of a community’s sole service on a channel reserved for noncommercial educational broadcast service.<sup>45</sup>

In establishing this presumption for the Upper 700 MHz Band, the Commission concluded that it was consistent with Congressional objectives, should generally increase the attractiveness of the spectrum to potential 700 MHz licensees, and will facilitate the expeditious

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<sup>43</sup> *Service Rules for the 746-764 and 776-794 MHz Bands and Revisions to Part 27 of the Commission’s Rules*, 15 FCC Rcd 20845 (2000). (*Upper 700 MHz Reconsideration Order*)

<sup>44</sup> *Upper 700 MHz Reconsideration Order* at ¶ 61.

<sup>45</sup> *Id.*

transition to DTV without undue loss of broadcast service.<sup>46</sup> QUALCOMM believes that similar objectives apply to the Lower 700 MHz Band. Moreover, we believe that similar benefits and detriments apply. The benefit of introducing new or expanded wireless services, such as MediaFLO, certainly outweighs the possibility of interference temporarily affecting less than 2% of a station's service population.

Moreover, this presumption would not be conclusive. There may be cases where a 700 MHz licensee's engineering study shows a *de minimis* impact on broadcast service, but special or unique factors compel the Commission to find that the presumption has been rebutted. In those cases, the Commission would consider all of the public interest factors involved and make a decision whether or not to approve the request based on those individual factors.

QUALCOMM believes that establishing a streamlined processing procedure for Section 27.60 showings will accelerate the deployment of new 700 MHz services, will increase the value of the spectrum, and will reduce the administrative burden on the Commission, without substantially affecting the provision of broadcast service.

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<sup>46</sup> *Id.*

#### IV CONCLUSION

QUALCOMM believes that the Commission should declare that: (1) OET-69 is an acceptable methodology for demonstrating compliance with the TV/DTV interference protection criteria of Section 27.60; (2) a *de minimis* threshold of 2% is established as the acceptable standard for interference; and (3) streamlined procedures and a rebuttable presumption in favor of 700 MHz operations be established. Such a declaration will serve the public interest by bringing new and innovative wireless services to the marketplace, while causing only a *de minimis* and temporary impact on broadcast service.

Respectfully submitted,

**QUALCOMM Incorporated**

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Dated: January 10, 2005

## **ATTACHMENT A**

# **TechWare, Inc**

## **DECLARATION OF WILLIAM MEINTEL**

I, William Meintel, under penalty of perjury, hereby declare and state as follows:

I am an officer in the firm of TechWare, Inc. with offices at 14101 Parke Long Court, Suite 206, Chantilly, Virginia, 20151.

I have been instrumental in the development of the computer software currently being used by the Federal Communications Commission (FCC) for the calculation of interference between television (TV), digital television (DTV), low power television (LPTV) and Class A TV assignments. This software is commonly referred to as "TV Process" and "OET-69".

I have been engaged in communications and computer software business for more than 35 years. My qualifications are a matter of record with the Federal Communications Commission (FCC).

The firm of TechWare, Inc. has been requested by Qualcomm, Inc. to provide its opinion concerning possible modifications to the FCC's "TV Process (OET-69)" software to accommodate interference calculations from Part 27 stations operating in the 700 MHz bands.

It is my opinion that software code changes can be made to add a service class to distinguish Part 27 entries from television (TV), digital television (DT), LPTV (TX), and Class A TV (CA) entries. Perhaps something like "27" could be employed for the Part 27 service class.

The Part 27 entry could be treated similarly to a DTV entry except for software code changes to account for the differences in desired-to-undesired (D/U) interference ratios, as described below.

Co-channel Part 27 to TV D/U ratio 40 dB

Co-channel Part 27 to DTV D/U ratio 23 dB [there will be no variation of this D/U ratio depending on the DTV S/N ratio as indicated by Section 73.623(c)(3)(i) of the FCC rules]

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Adjacent channel Part 27 to TV D/U ratio 0 dB

Adjacent channel Part 27 to DTV D/U ratio -23 dB

No consideration would be given for interference calculations to analog TV assignments on "taboo" channels.

No consideration would be given to LPTV assignments.

No consideration would be given to Class A TV assignments.

In situations where more than one Part 27 transmitter is proposed in a single local TV market, the fields from each transmitter could be summed in a Root-Sum-Square method to account for the additive effects of multiple transmitters.

The calculated new or unique interference caused by the Part 27 entry to full service TV and DTV stations could be evaluated for meeting a "2% maximum" test. The Part 27 entry could be further evaluated so that the cumulative interference caused to a full service TV and DTV entry does not increase if it already receives more than 10% calculated interference.

It is my opinion that the software changes to "TV Process (OET-69)" to accommodate interference calculations from Part 27 stations as described above, can be accomplished within 60 days.

The above statement has been prepared by me personally or under my direction. All facts contained therein are true of my own knowledge except where stated to be on information or belief, and as to those facts, I believe them to be true.

Signed and dated this 16th day of December, 2004.

✓ William R. Meintel

Signature valid

William Meintel  
President  
TechWare, Inc.

Digitally signed by William R. Meintel  
DN: cn=William R. Meintel, o=TechWare, Inc., c=US  
Date: 2005.01.09 11:06:11 -0500

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**TechWare, Inc.**  
**14101 Parke Long Court - Suite 206**  
**Chantilly, Virginia 20151-1645**  
**Phone: 703-222-5842 FAX: 703-222-5843**



## **ATTACHMENT B**

ENGINEERING EXHIBIT  
PREPARED FOR QUALCOMM INCORPORATED  
IN SUPPORT OF A PETITION FOR DECLARATORY RULING  
THAT OET-69 METHODOLOGY IS ACCEPTABLE  
TO DEMONSTRATE COMPLIANCE WITH SECTION 27.60  
OF THE FEDERAL COMMUNICATIONS COMMISSION'S RULES

Engineering Statement

This engineering exhibit has been prepared on behalf of QUALCOMM Incorporated in support of a Petition for Declaratory Ruling requesting that the Federal Communications Commission declare that the methodology of OET Bulletin No. 69 (OET-69), with minor modifications as proposed herein, is an acceptable engineering methodology to demonstrate compliance with the TV/DTV interference protection criteria of Section 27.60 of the Commission's Rules for QUALCOMM's MediaFlo™ service, which QUALCOMM plans to deploy on the Lower 700 MHz D-Block.<sup>1</sup>

Since QUALCOMM's MediaFlo™ transmitters will operate under Part 27 and not Part 73 of the FCC Rules, QUALCOMM proposes minor modifications to the OET-69 methodology to permit evaluation of its Part 27 transmitting stations. This exhibit describes pertinent characteristics of QUALCOMM's MediaFlo™ transmission system, outlines the proposed modifications to the OET-69 methodology to accommodate Part 27 licensees, and provides three example engineering studies using the modified OET-69 methodology as proposed herein.

QUALCOMM's MediaFlo™ System Characteristics

QUALCOMM's FLO™ (Forward Link Only) technology is a transmission-only service to mobile receivers. It includes no mobile transmitters. Furthermore, the MediaFlo™ transmitting stations are designed to be widely spaced and cover large geographic areas. The MediaFlo™ emissions characteristics are DTV-like in nature with an occupied bandwidth between 5.5 and 6 MHz centered in the channel.

In congested markets, more than one MediaFlo™ transmitting station may be deployed. QUALCOMM proposes a Root-Sum-Square (RSS) method of summing undesired fields from multiple MediaFlo™ transmitters located within the same local market.

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<sup>1</sup> The Lower 700 MHz D-Block contains the spectrum from 716 to 722 MHz and coincides with present television channel 55.

## Proposed Modifications to OET-69 Methodology

OET-69 describes a methodology for evaluating service from and interference to broadcast television stations. It is divided into three parts: a methodology for evaluation of service, a methodology for evaluation of interference and a description of the FCC Longley-Rice computer program. QUALCOMM proposes no changes to the first part of OET-69. It proposes only minor changes to the second and third parts of OET-69.

### *Part 1: Evaluation of Service*

QUALCOMM does not propose any changes to the current OET-69 methodology of evaluating television station service. It does not propose creation of a new class of service for Part 27 licensees, and therefore there is no need to establish a method of determining service for Part 27 stations.<sup>2</sup> QUALCOMM's proposed changes only impact evaluation of interference.

### *Part 2: Evaluation of Interference*

QUALCOMM proposes four minor modifications to the OET-69 methodology of evaluating interference so as to permit evaluation of interference from Part 27 stations. These minor modifications provide a method for evaluating interference to full-service analog and digital television stations operating on channels 54, 55, and 56 during the remainder of the DTV Transition Period. At the end of the DTV Transition Period, these analog and digital television stations will vacate these channels and there will be no more need for evaluation of interference to them.

The proposed changes to the OET-69 methodology of evaluating interference are as follows:

1. For Part 27 stations, the D/U ratios for co-channel and adjacent-channel protection of broadcast stations will be modified to reflect the D/U ratios contained in Section 27.60.
2. For Part 27 stations the D/U ratio for determining co-channel interference to DTV service will be +23 dB at all locations and will not be adjusted based on the signal-to-noise ratio of the DTV signal.
3. In accordance with Section 27.60, no consideration will be given to taboo-channel interference to analog television stations.
4. Where multiple Part 27 transmitting stations are to be deployed in a local broadcast market, a Root-Sum-Square (RSS) summation of undesired fields from individual Part 27 transmitting stations will be used to establish the "worst-case" interfering signal in each grid evaluated.

A discussion of the proposed changes to the OET-69 methodology follows.

The first proposed change is to adopt the D/U ratios of Section 27.60 for evaluation of interference from Part 27 transmitting stations. It is noted that the co-channel and

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<sup>2</sup> QUALCOMM does not seek protection from full service TV and DTV station interference.

adjacent-channel D/U ratios contained in Section 27.60 are greater than those contained in OET-69 for all cases except co-channel, non-offset analog into analog TV. A comparison of the D/U ratios is contained in the following table.

D/U Ratio Comparison (dB)			
Relationship	Undesired Signal Type		
	Analog TV	Digital TV	Proposed Part 27
Co-channel into desired DTV	+2	+15	+23
Co-channel into desired analog TV	+28 (offset) +45 (non-offset)	+34	+40
Lower adjacent channel into desired DTV	-48	-28	-23
Lower adjacent channel into desired analog TV	-3	-14	0
Upper adjacent channel into desired DTV	-49	-26	-23
Upper adjacent channel into desired analog TV	-13	-17	0

The second proposed change relates to the adjustable D/U ratio for determining co-channel interference to DTV service found in Section 73.623 of the Commission's Rules. For co-channel analog TV into DTV the D/U ratio varies from +2 dB at locations where the DTV service signal-to-noise ratio is 25 dB or greater to as great as +21 dB where the DTV service signal-to-noise ratio is 16 dB. For co-channel DTV into DTV the D/U ratio varies from +15 dB where the DTV service signal-to-noise ratio is 28 dB or greater to as great as +23 dB where the DTV service signal-to-noise ratio is 16 dB. QUALCOMM proposes a flat +23 dB D/U ratio, which matches the D/U ratio contained in Section 27.60 and is the "worst-case" D/U ratio for co-channel interference to DTV service presently in OET-69.

Since Section 27.60 does not prescribe consideration of taboo-channel interference to analog TV service during the DTV Transition Period, QUALCOMM proposes that taboo-channel interference from Part 27 transmitters to analog TV service not be considered in the modified OET-69 methodology.

Finally, with respect to the fourth proposed change, QUALCOMM may require more than one MediaFlo™ transmitter in certain local markets. To evaluate the combined interference impact from multiple transmitters in the same local market, QUALCOMM proposes use of an RSS method of summing predicted fields from multiple transmitters. The RSS method provides a "worst-case" prediction of the combined interference effects by assuming that the fields from the individual transmitters add in all cases (when in fact they may cancel in some cases).<sup>3</sup> Adding the RSS method of determining the combined

<sup>3</sup> The interfering fields from each MediaFlo™ transmitter, in dBμV/m, in each OET-69 grid would be converted to their corresponding linear values in μV/m, squared, then summed, and the square root of the sum taken to get the "worst-case" combined field in μV/m. This "worst-case" combined field would then be converted back into logarithmic form in dBμV/m and tested to determine whether it meets the required D/U ratio.

interference from multiple transmitters should be a relatively easy modification to the OET-69 software.

QUALCOMM proposes that evaluation of new interference from proposed Part 27 transmitting stations proceed as follows. Determination of interference from analog and DTV stations will be performed first in accordance with the existing implementation of the OET-69 methodology. Then interference from proposed Part 27 transmitting stations will be evaluated. A Part 27 station will not be considered to cause new interference at locations where there is no service or in places where interference from analog or DTV stations already exists. The calculated new interference caused by a proposed Part 27 transmitter (or transmitters) to full service TV and DTV stations will be evaluated for meeting a "2% maximum" test. This "2% maximum" test will be applied on a local television market (DMA) basis. Proposed Part 27 transmitter(s) in a local market cannot create new interference to more than 2% of any full service TV or DTV station service population (defined to be a station's service population not affected by terrain losses). Any Part 27 proposal will be further evaluated to determine that the cumulative interference caused to a full service TV or DTV station could not increase if it already receives more than 10% calculated interference.

### *Part 3: The FCC Longley-Rice Computer Program*

To facilitate evaluation of interference from Part 27 transmitting stations, QUALCOMM proposes that minor modifications be made in the FCC Longley-Rice computer program. PCCI has modified its own implementation of the program to evaluate interference from MediaFlo™ transmitting stations in accordance with the changes in evaluation of interference as described above. Sample output from the modified program is shown below.

Analysis of DTV Station, Channel 55		
	Area (sq km)	Pop
within Noise Limited Contour	17688.56	6939790
not affected by terrain losses	17161.35	6744121
Interference Summary		
*****		
lost to NTSC IX	138.43	21912
lost to additional IX by DTV	490.89	93344
lost to additional IX by P27	18.65	3839
lost to all IX	647.97	119095

### Examples of Evaluation of MediaFlo™ Proposals Under the Modified OET-69 Methodology

For the purpose of demonstrating the evaluation of MediaFlo™ transmitters under the proposed, modified OET-69 methodology, PCCI modified its implementation of the

OET-69 software to reflect the changes as proposed above. Three example markets were evaluated under the modified OET-69 software: Phoenix, New Orleans and Oklahoma City. The Phoenix market involves a proposed MediaFlo™ transmitter to be nearly collocated with an existing, upper adjacent-channel DTV station. The New Orleans market involves a proposed MediaFlo™ transmitter located approximately 34 km from a lower adjacent-channel analog TV station and within the station's Grade B contour. The Oklahoma City market involves two MediaFlo™ transmitters located outside the service contours of all incumbent co-channel and adjacent-channel TV and DTV stations. All three analyses were run using 1 km grid squares, 1 km terrain increments and population data from the 2000 U.S. Census.

Figure 1 contains our analysis of the Phoenix market. Sheet 1 of Figure 1 contains pertinent technical parameters for the proposed MediaFlo™ transmitter and a listing of incumbent TV and DTV stations studied; only upper adjacent-channel DTV station, KNXV-DT, channel 56, licensed to Phoenix requires study. Sheet 2 of Figure 2 is a map showing the equivalent Grade B contours [41 dBμ F(50,90) contour] of the licensed and authorized KNXV-DT facilities and the predicted 64 dBμ undesired contour for the proposed MediaFlo™ transmitter. Since the MediaFlo™ transmitter site is nearly collocated with KNXV-DT, it cannot provide contour protection to KNXV-DT. Sheets 3 and 4 contain the results of the interference analysis performed using the modified OET-69 software. When studied under the revised OET-69 methodology, the proposed MediaFlo™ transmitter meets the interference criteria. Out of a total service population of 3,208,942 for the licensed KNXV-DT facility, the MediaFlo™ transmitter is predicted to cause interference to 14,177 persons (0.44 percent). Out of a total service population of 3,227,535 for the authorized (CP) KNXV-DT facility, the MediaFlo™ transmitter is predicted to cause interference to only 2,895 persons (0.09 percent).

Figure 2 contains our analysis of the New Orleans market. Sheet 1 of Figure 2 contains pertinent technical parameters for the proposed MediaFlo™ transmitter and a listing of incumbent TV and DTV stations studied. Two TV and two DTV stations require study in this market. Sheet 2 of Figure 2 is a map showing the Grade B contours of the TV stations, the equivalent Grade B contours of the DTV stations and the pertinent interfering contours of the proposed MediaFlo™ transmitter. The proposed MediaFlo™ transmitter provides contour protection to upper adjacent-channel station KLFY-DT, but co-channel stations WBPB-TV and WAKA-DT and lower adjacent-channel station WUPL-TV require further study. Sheets 3 through 6 contain the results of the interference analysis performed using the modified OET-69 software. When studied under the revised OET-69 methodology, the proposed MediaFlo™ transmitter meets the proposed interference criteria to all three of these stations. Study results are summarized in the following table.

Analysis of New Interference from Proposed MediaFlo™ Transmitter, New Orleans			
Desired Station	Service (Population Not Affected by Terrain Losses)	Population Subject to New Interference from Proposed MediaFlo™ Transmitter	Population Subject to New Interference as Percentage of Service
WUPL (LIC)	1,424,059	3,674	0.26%
WBPB (LIC)	931,112	1,361	0.15%
WAKA (CP)	703,621	0	0.00%

Figure 3 contains our analysis of the Oklahoma City market. Sheet 1 of Figure 3 contains pertinent technical parameters for the two proposed MediaFlo™ transmitters and a listing of incumbent TV and DTV stations studied. One TV and two DTV stations require study in this market. Sheet 2 of Figure 3 is a map showing the Grade B contours of the TV stations, the equivalent Grade B contours of the DTV stations and the pertinent interfering contours of the proposed MediaFlo™ transmitters. The proposed MediaFlo™ transmitters provide contour protection to upper adjacent-channel station KJRH-DT, but co-channel stations KLDI-TV and KOTV-DT require further study. Sheets 3 through 6 contain the results of the interference analysis performed using the modified OET-69 software using the RSS method (as described above) to calculate the undesired field from the combination of the two proposed MediaFlo™ transmitters. When studied under the revised OET-69 methodology, the proposed MediaFlo™ transmitters meet the proposed interference criteria to all of these stations. Study results are summarized in the following table.

Analysis of New Interference from Proposed MediaFlo™ Transmitters, Oklahoma City			
Desired Station	Service (Population Not Affected by Terrain Losses)	Population Subject to New Interference from Proposed MediaFlo™ Transmitter	Population Subject to New Interference as Percentage of Service
KOTV-DT (CP)	1,240,879	23,031	1.86%
KLDI-TV (LIC)	4,721,607	0	0.00%
KLDI-TV (CP)	5,194,129	0	0.00%

Louis R. duTreil, Jr.

David E. Dickmann

December 17, 2004

Service and Interference Analysis  
MediaFlo™ Phoenix, AZ

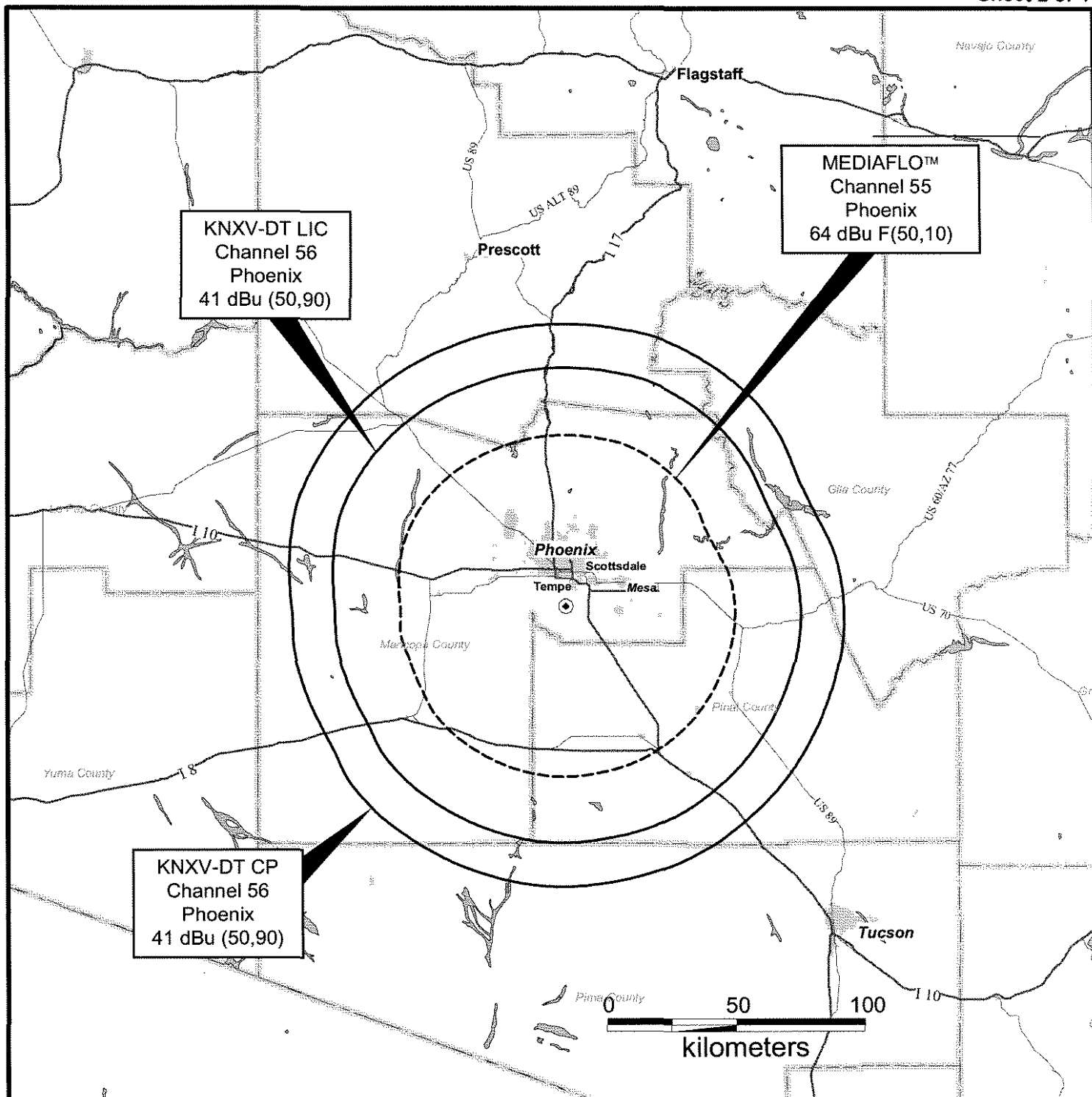
Proposed Station

MediaFlo PHOEGS  
Phoenix, AZ  
Channel 55  
Site Coordinates: 33-19-57 / 112-03-56  
Antenna Type: Non-DA  
Effective Radiated Power: 50 kW  
Antenna Radiation Center: 840 m AMSL

Broadcast Stations Considered in Analysis

Call Sign	Status	Channel	Service	Community	State	Antenna Type	Latitude	Longitude	ERP (kW)	RCAMSL (m)	Bearing (deg T)	Distance (km)
KNXV-DT	LIC	56	DT	PHOENIX	AZ	ND	33-20-00	112-03-46	73	866	70.2	0.3
KNXV-DT	CP	56	DT	PHOENIX	AZ	ND	33-20-00	112-03-46	500	865.6	70.2	0.3





## **STATION CONTOURS**

**MEDIAFLO™**  
**PHOENIX, AZ**

Professional Communications Consultants, Inc., Sarasota, Florida

Modified OET-69  
Service and Interference Analysis  
MediaFlo™ Phoenix, AZ

Service and Interference Results:

Desired Station:

KNXV-DT 33-20-00 112-03-46 56(N) 73.000 kW-ND 866 m AMSL 90.0 %  
PHOENIX AZ  
LIC BLCDDT-20000120AAR  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	24642.6	3219993
not affected by terrain losses	19369.8	3208942

P27 Undesired Stations Considered:

PHOEGS 33-19-57 112-03-56 55(N) 50.000 kW-ND 840 m AMSL 10.0 %  
PHOENIX AZ  
APP  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: -23.00 dB

Summary of Interference to BLCDDT-20000120AAR

	Area (sq km)	Pop
lost to NTSC IX	0.0	0
lost to additional IX by DTV	0.0	0
total lost to broadcast IX	0.0	0
lost to additional IX by P27	160.0	14177
lost to all IX	160.0	14177
Total SERVICE	19209.8	3194765

New P27 IX as percent of  
desired station population  
not affected by terrain losses 0.44%

Total IX as percent of  
desired station population  
not affected by terrain losses 0.44%

Used 2000 Census data

Service and Interference Results (con't):

Desired Station:

KNXV-DT 33-20-00 112-03-46 56(N) 500.000 kW-ND 865.6 m AMSL 90.0 %  
PHOENIX AZ  
CP MOD BMPCDT-19991230ABB  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	34450.7	3234611
not affected by terrain losses	26863.0	3227535

P27 Undesired Stations Considered:

PHOEGS 33-19-57 112-03-56 55(N) 50.000 kW-ND 840 m AMSL 10.0 %  
PHOENIX AZ  
APP  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: -23.00 dB

Summary of Interference to BMPCDT-19991230ABB

	Area (sq km)	Pop
lost to NTSC IX	0.0	0
lost to additional IX by DTV	0.0	0
total lost to broadcast IX	0.0	0
lost to additional IX by P27	65.6	2895
lost to all IX	65.6	2895
 Total SERVICE	 26797.4	 3224640

New P27 IX as percent of  
desired station population  
not affected by terrain losses 0.09%

Total IX as percent of  
desired station population  
not affected by terrain losses 0.09%

Used 2000 Census data

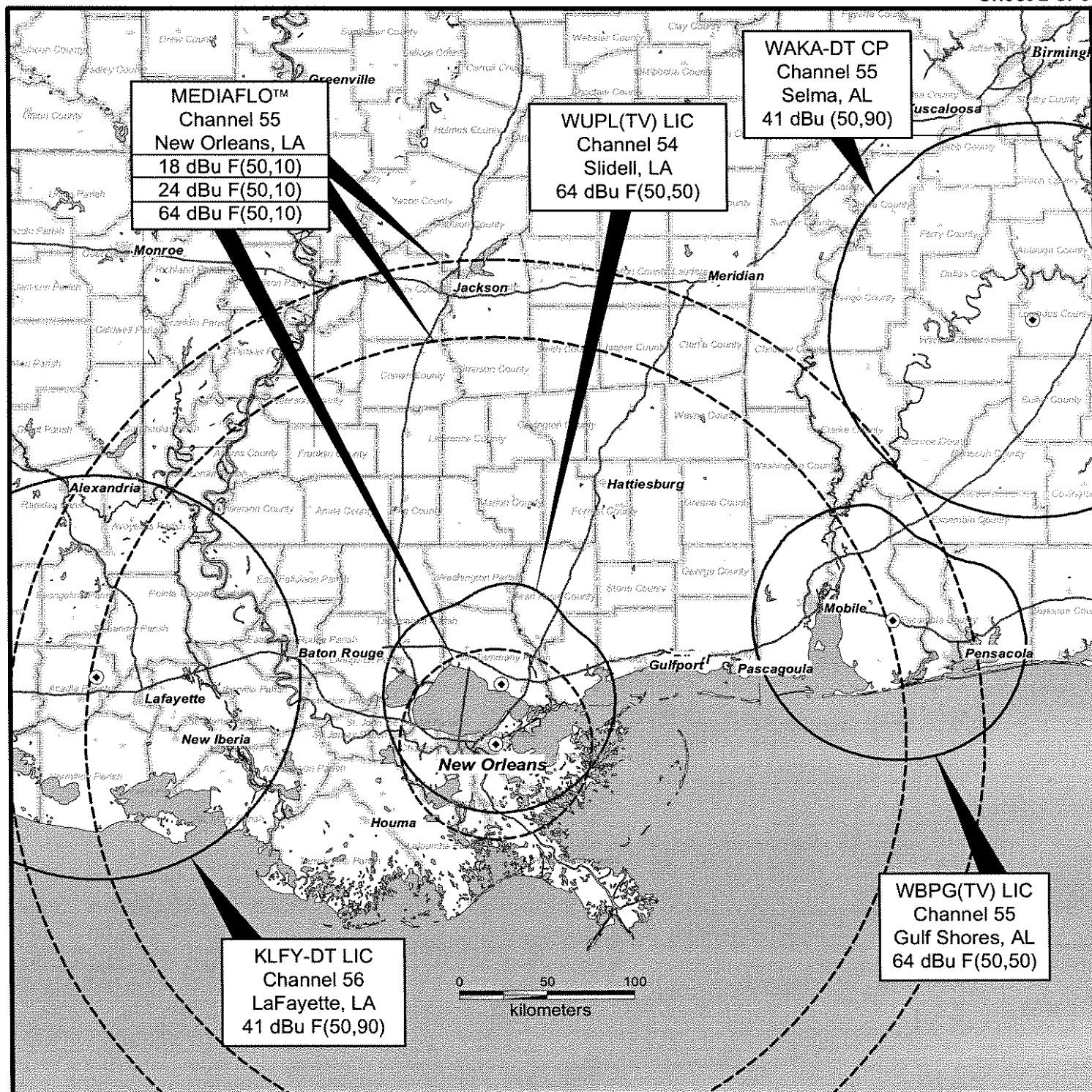
Service and Interference Analysis  
MediaFlo™ New Orleans, LA

Proposed Station

MediaFlo NEW01A  
New Orleans, LA  
Channel 55  
Site Coordinates: 29-58-42 / 089-56-26  
Antenna Type: Non-DA  
Effective Radiated Power: 50 kW  
Antenna Radiation Center: 291 m AMSL

Broadcast Stations Considered in Analysis

Call Sign	Status	Channel	Service	Community	State	Antenna Type	Latitude	Longitude	ERP (kW)	RCAMSL (m)	Bearing (deg T)	Distance (km)
WUPL	LIC	54	TV	SLIDELL	LA	DA	30-17-08	089-54-18	4370	219	5.7	34.23
WBPG	LIC	55	TV	GULF SHORES	AL	DA	30-36-40.3	087-36-26.8	3750	340	72	235.16
WAKA-DT	CP	55	DT	SELMA	AL	ND	31-08-58	086-56-51	1000	554	50.5	385.9
KLFY-DT	LIC	56	DT	LAFAYETTE	LA	ND	30-19-19	092-16-59	1000	516	280.2	228.87



## STATION CONTOURS

MEDIAFLO™  
NEW ORLEANS, LA

Professional Communications Consultants, Inc., Sarasota, Florida

Modified OET-69  
Service and Interference Analysis  
MediaFlo™ New Orleans, LA

Service and Interference Results:

Desired Station:

WUPL 30-17-08 089-54-18 54(+) 4370.000 kW-DA 219 m AMSL 50.0 %  
SLIDE LL LA  
LIC BLCT-19950530KE  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	12148.6	1424059
not affected by terrain losses	12147.6	1424059

P27 Undesired Stations Considered:

NEW01A 29-58-42 89-54-18 55(N) 50.000 kW-ND 291 m AMSL 10.0 %  
NEW ORLEANS LA  
APP null  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: 0.00 dB

Summary of Interference to BLCT-19950530KE

	Area (sq km)	Pop
lost to NTSC IX	0.0	0
lost to additional IX by DTV	2.0	0
total lost to broadcast IX	2.0	0
lost to additional IX by P27	470.1	3674
lost to all IX	472.0	3674
Total SERVICE	11675.6	1420385

New P27 IX as percent of  
desired station population  
not affected by terrain losses 0.26%

Total IX as percent of  
desired station population  
not affected by terrain losses 0.26%

Used 2000 Census data

Service and Interference Results (con't):

Desired Station:

WBPB 30-36-40 087-36-26 55(Z) 3750.000 kW-DA 340 m AMSL 50.0 %  
GULF SHORES AL  
LIC BMLCT-20021009AAA  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	15521.0	931133
not affected by terrain losses	15499.0	931112

P27 Undesired Stations Considered:

NEW01A 29-58-42 89-54-18 55(N) 50.000 kW-ND 291 m AMSL 10.0 %  
NEW ORLEANS LA  
APP  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: 40.00 dB

Summary of Interference to BMLCT-20021009AAA

	Area (sq km)	Pop
lost to NTSC IX	0.0	0
lost to additional IX by DTV	582.0	7915
total lost to broadcast IX	582.0	7915
lost to additional IX by P27	49.9	1361
lost to all IX	631.9	9276
Total SERVICE	14867.1	921836

New P27 IX as percent of  
desired station population  
not affected by terrain losses 0.15%

Total IX as percent of  
desired station population  
not affected by terrain losses 1.00%

Used 2000 Census data

Service and Interference Results (con't):

Desired Station:

WAKA-DT 32-08-58 086-46-51 55(N) 1000.000 kW-ND 554 m AMSL 90.0 %  
SELMA AL  
CP MOD BMPCDT-20020320ACQ  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	37637.8	711176
not affected by terrain losses	36980.2	703621

P27 Undesired Stations Considered:

NEW01A 29-58-42 89-54-18 55(N) 50.000 kW-ND 291 m AMSL 10.0 %  
NEW ORLEANS LA  
APP null  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: 23.00 dB

Summary of Interference to BMPCDT-20020320ACQ

	Area (sq km)	Pop
lost to NTSC IX	391.6	3579
lost to additional IX by DTV	305.2	3354
total lost to broadcast IX	696.8	6933
lost to additional IX by P27	0.0	0
lost to all IX	696.8	6933
 Total SERVICE	 36283.4	 696688
 New P27 IX as percent of desired station population not affected by terrain losses	  0.00%	
 Total IX as percent of desired station population not affected by terrain losses	  0.99%	

Used 2000 Census data



Service and Interference Results (con't):

Desired Station:

KLFY-DT 30-19-19 092-16-59 56(N) 1000.000 kW-ND 516 m AMSL 90.0 %  
LAFAYETTE LA  
LIC BLCDDT-20020501AAE  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	39287.2	1188522
not affected by terrain losses	39279.2	1188480

P27 Undesired Stations Considered:

NEW01A 29-58-42 89-54-18 55(N) 50.000 kW-ND 291 m AMSL 10.0 %  
NEW ORLEANS LA  
APP  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: -23.00 dB

Summary of Interference to BLCDDT-20020501AAE

	Area (sq km)	Pop
lost to NTSC IX	0.0	0
lost to additional IX by DTV	0.0	0
total lost to broadcast IX	0.0	0
lost to additional IX by P27	0.0	0
lost to all IX	0.0	0
Total SERVICE	39279.2	1188480

New P27 IX as percent of  
desired station population  
not affected by terrain losses 0.00%

Total IX as percent of  
desired station population  
not affected by terrain losses 0.00%

Used 2000 Census data

Service and Interference Analysis  
MediaFlo™ Oklahoma City, OK

Proposed Stations

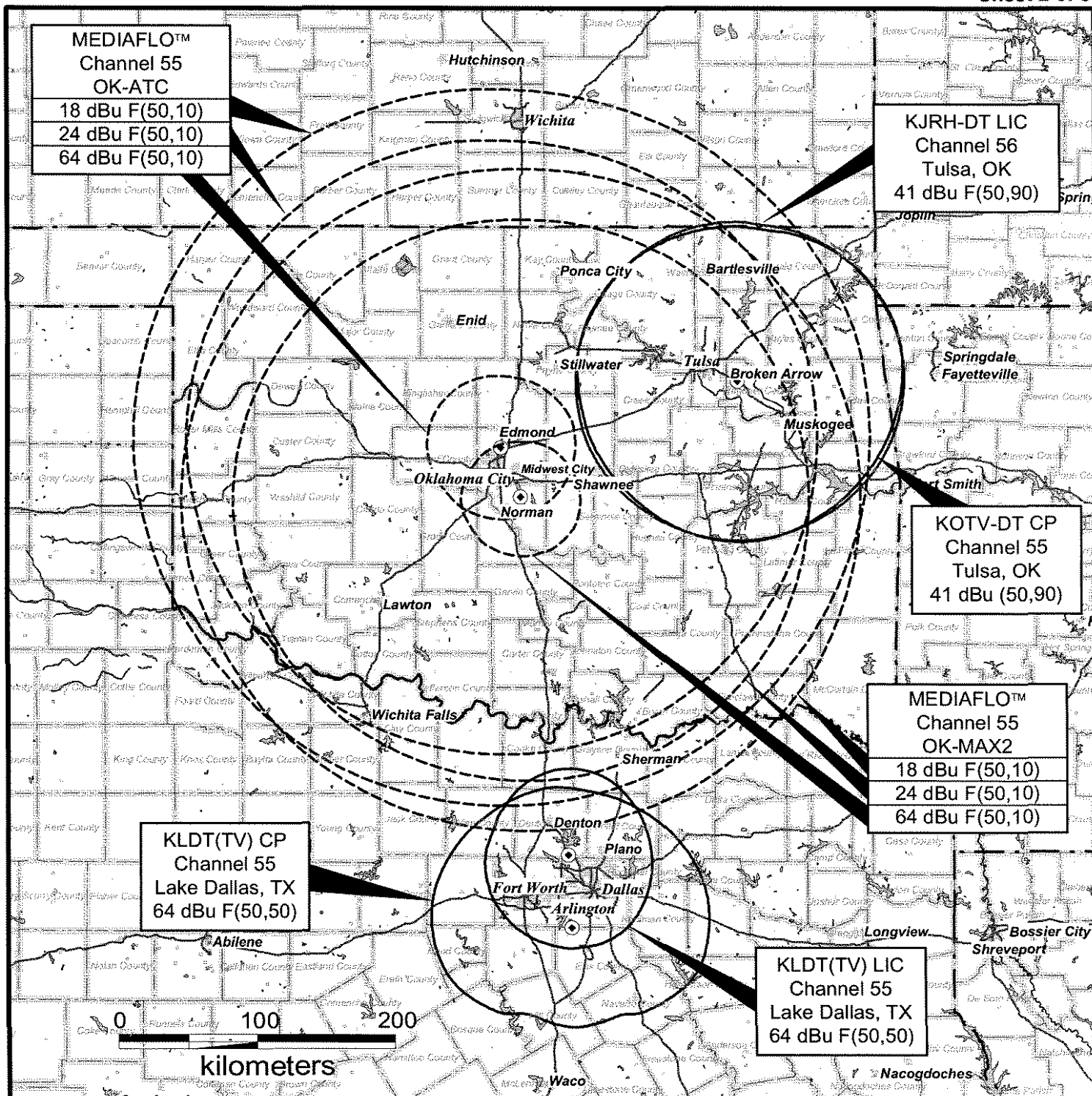
OK-ATC  
Channel 55  
Site Coordinates: 35-35-52 / 097-29-23  
Antenna Type: Non-DA  
Effective Radiated Power: 25 kW  
Antenna Radiation Center: 676 m AMSL

OK-Max2  
Channel 55  
Site Coordinates: 35-16-58 / 097-20-18  
Antenna Type: Non-DA  
Effective Radiated Power: 25 kW  
Antenna Radiation Center: 523 m AMSL

Broadcast Stations Considered in Analysis

Call Sign	Status	Channel	Service	Community	State	Antenna Type	Latitude	Longitude	ERP (kW)	RCAMSL (m)	Bearing (deg T)*	Distance (km)*
KOTV-DT	CP	55	DT	TULSA	OK	DA	36-01-15	095-40-32	970	684.8	73.4	170.5
KLDT	LIC	55	TV	LAKE DALLAS	TX	DA	33-00-19	096-58-59	3240	303	170.7	291.3
KLDT	CP	55	TV	LAKE DALLAS	TX	DA	32-32-36	096-57-32	5000	698	171.7	342.3
KJRH-DT	LIC	56	DT	TULSA	OK	ND	36-01-15	095-40-32	800	698	73.4	170.5

\*from OK-ATC



## STATION CONTOURS

### MEDIAFLO™ OKLAHOMA CITY, OK

Professional Communications Consultants, Inc., Sarasota, Florida

Modified OET-69  
Service and Interference Analysis  
MediaFlo™ Oklahoma City, OK

Service and Interference Results:

Desired Station:

KOTV 36-01-15 095-40-32 55(N) 970.000 kW-DA 684.8 m AMSL 90.0 %  
TULSA OK  
CP BPCDT-19991012AAQ  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	36996.9	1253318
not affected by terrain losses	36131.2	1240879

P27 Undesired Stations Considered:

OK-ATC 35-35-52 97-29-23 55(N) 25.000 kW-ND 676 m AMSL 10.0%  
OKLAHOMA CITY OK  
APP  
Using DEFAULT vertical antenna pattern

OK-Max2 35-16-58 97-20-18 55(N) 25.000 kW-ND 523 m AMSL 10.0%  
OKLAHOMA CITY OK  
APP  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: 23.00 dB

Summary of Interference to BPCDT-19991012AAQ

	Area (sq km)	Pop
lost to NTSC IX	35.5	189
lost to additional IX by DTV	26.7	520
total lost to broadcast IX	62.2	709
lost to additional IX by P27	2277.3	23031
lost to all IX	2339.5	23740
Total SERVICE	33791.7	1217139

New P27 IX as percent of  
desired station population  
not affected by terrain losses 1.86%

Total IX as percent of  
desired station population  
not affected by terrain losses 1.91%

Used 2000 Census data

Service and Interference Results (con't):

Desired Station:

KLDT 33-00-19 096-58-59 55(Z) 3240.000 kW-DA 303 m AMSL 50.0%  
LAKE DALLAS TX  
LIC BLCT-19990611KF  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	11079.9	4724557
not affected by terrain losses	10979.1	4721607

P27 Undesired Stations Considered:

OK-ATC 35-35-52 97-29-23 55(N) 25.000 kW-ND 676 m AMSL 10.0%  
OKLAHOMA CITY OK  
APP  
Using DEFAULT vertical antenna pattern

OK-Max2 35-16-58 97-20-18 55(N) 25.000 kW-ND 523 m AMSL 10.0%  
OKLAHOMA CITY OK  
APP  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: 40.00 dB

Summary of Interference to BLCT-19990611KF

	Area (sq km)	Pop
lost to NTSC IX	10.0	308
lost to additional IX by DTV	321.3	49653
total lost to broadcast IX	331.3	49961
lost to additional IX by P27	0.0	0
lost to all IX	331.3	49961
Total SERVICE	10647.8	4671646

New P27 IX as percent of  
desired station population  
not affected by terrain losses 0.00%

Total IX as percent of  
desired station population  
not affected by terrain losses 1.07%

Used 2000 Census data

Service and Interference Results (con't):

Desired Station:

KLDT 32-32-36 096-57-32 55(Z) 5000.000 kW-DA 698 m AMSL 50.0%  
LAKE DALLAS TX  
LIC BPCT-20020307ABK  
Using DEFAULT vertical antenna pattern

	Area (sq km)	Pop
within Noise Limited Contour	24313.5	5197436
not affected by terrain losses	24063.7	5194129

P27 Undesired Stations Considered:

OK-ATC 35-35-52 97-29-23 55(N) 25.000 kW-ND 676 m AMSL 10.0%  
OKLAHOMA CITY OK  
APP  
Using DEFAULT vertical antenna pattern

OK-Max2 35-16-58 97-20-18 55(N) 25.000 kW-ND 523 m AMSL 10.0%  
OKLAHOMA CITY OK  
APP  
Using DEFAULT vertical antenna pattern

D/U IX Ratio: 40.00 dB

Summary of Interference to BPCT-20020307ABK

	Area (sq km)	Pop
lost to NTSC IX	21.5	281
lost to additional IX by DTV	0.0	0
total lost to broadcast IX	21.5	281
lost to additional IX by P27	0.0	0
lost to all IX	21.5	281
Total SERVICE	24042.3	5193848

New P27 IX as percent of  
desired station population  
not affected by terrain losses 0.00%

Total IX as percent of  
desired station population  
not affected by terrain losses 0.01%

Used 2000 Census data